

**U.S. FISH AND WILDLIFE SERVICE  
SPECIES ASSESSMENT AND LISTING PRIORITY ASSIGNMENT FORM**

SCIENTIFIC NAME: *Schiedea salicaria*

COMMON NAME: No common name

LEAD REGION: Region 1

INFORMATION CURRENT AS OF: July 2005

**STATUS/ACTION**

☐ Species assessment - determined species did not meet the definition of endangered or threatened under the Act and, therefore, was not elevated to Candidate status

☐ New candidate

☒ Continuing candidate

☐ Non-petitioned

☒ Petitioned - Date petition received: May 11, 2004

☐ 90-day positive - FR date:

☒ 12-month warranted but precluded - FR date: May 11, 2005

☐ Did the petition request a reclassification of a listed species?

**FOR PETITIONED CANDIDATE SPECIES:**

a. Is listing warranted (if yes, see summary of threats below)? yes

b. To date, has publication of a proposal to list been precluded by other higher priority listing actions? yes

c. If the answer to a. and b. is "yes", provide an explanation of why the action is precluded. We find that the immediate issuance of a proposed rule and timely promulgation of a final rule for this species has been, for the preceding 12 months, and continues to be, precluded by higher priority listing actions. During the past 12 months, most of our national listing budget has been consumed by work on various listing actions to comply with court orders and court-approved settlement agreements, meeting statutory deadlines for petition findings or listing determinations, emergency listing evaluations and determinations and essential litigation-related, administrative, and program management tasks. We will continue to monitor the status of this species as new information becomes available. This review will determine if a change in status is warranted, including the need to make prompt use of emergency listing procedures. For information on listing actions taken over the past 12 months, see the discussion of "Progress on Revising the Lists," in the current CNOR which can be viewed on our Internet website (<http://endangered.fws.gov>).

☐ Listing priority change

Former LP: ☐

New LP: ☐

Date when the species first became a Candidate (as currently defined): 1997

☐ Candidate removal: Former LP: ☐

☐ A – Taxon is more abundant or widespread than previously believed or not subject to

the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status.

- \_\_\_ U – Taxon not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status due, in part or totally, to conservation efforts that remove or reduce the threats to the species.
- \_\_\_ F – Range is no longer a U.S. territory.
- \_\_\_ I – Insufficient information exists on biological vulnerability and threats to support listing.
- \_\_\_ M – Taxon mistakenly included in past notice of review.
- \_\_\_ N – Taxon does not meet the Act’s definition of “species.”
- \_\_\_ X – Taxon believed to be extinct.

ANIMAL/PLANT GROUP AND FAMILY: Flowering plants, Caryophyllaceae (Pink family)

HISTORICAL STATES/TERRITORIES/COUNTRIES OF OCCURRENCE: Hawaii, island of Maui

CURRENT STATES/ COUNTIES/TERRITORIES/COUNTRIES OF OCCURRENCE: Hawaii, island of Maui

LAND OWNERSHIP: *Schiedea salicaria* occurs on private and State lands.

LEAD REGION CONTACT: Paul Phifer, 503-872-2823, paul\_phifer@fws.gov

LEAD FIELD OFFICE CONTACT: Pacific Islands Fish and Wildlife Office, Christa Russell, 808-792-9400, christa\_russell@fws.gov

#### BIOLOGICAL INFORMATION:

Species Description *Schiedea salicaria* is an erect subshrub or shrub 3 to 7 decimeters (11.8 to 27.6 inches) tall with stems forming loose clumps and internodes 2.5 to 4 centimeters (1 to 1.6 inches) long. Leaves are opposite, narrowly elliptic and have revolute margins. The purple tinged flowers are perfect or pistillate and arise in somewhat contracted cymes. The bracts of the inflorescence are sometimes purple tinged as well (Wagner *et al.* 1999a).

Taxonomy *Schiedea salicaria* was described by Hillebrand. This species is recognized as a distinct taxon in Wagner *et al.* (1999a) and Wagner and Herbst (2003), the most recently accepted Hawaiian plant taxonomy.

Habitat Scattered on ridges and steep slopes, the typical habitat of *Schiedea salicaria* is remnant dry shrubland between the elevations of 180 and 360 meters (590 to 1,200 feet) (Wagner *et al.* 1999a).

Historical and Current Range/Current Status While there are no historic records of numbers of populations or individuals, qualitative accounts indicate that this species was not uncommon on the eastern side of west Maui. Currently, this species is declining throughout its range, and is

known from several populations totaling 100 to 300 individuals, typically of 25 individuals per population (R. Hobdy, Hawaii Division of Forestry and Wildlife, pers. comm. 1996; Hank Oppenheimer, Maui Land and Pineapple Company, pers. comm. 2004 and 2005; Wagner *et al.* 2005). We do not know the long-term trends for this species, but it is reasonable to assume the populations have continued to decline, since all of the threats are not managed throughout its range.

#### THREATS:

A. The present or threatened destruction, modification, or curtailment of its habitat or range.

This species is highly and imminently threatened by cattle (*Bos taurus*) that degrade and destroy habitat (R. Hobdy, pers. comm. 1996). Cattle, the wild progenitor of which was native to Europe, northern Africa, and southwestern Asia, were introduced to the Hawaiian Islands in 1793. Large feral herds developed as a result of restrictions on killing cattle decreed by King Kamehameha I. While small cattle ranches were developed on Kauai, Oahu, and west Maui, very large ranches of tens of thousands of acres were created on east Maui and Hawaii. Much of the land used in these private enterprises was leased from the State or was privately owned and classified as Forest Reserve and/or Conservation District land. Cattle eat native vegetation, trample roots and seedlings, cause erosion, create disturbed areas into which alien plants invade, and spread seeds of alien plants in their feces and on their bodies. The forest in areas grazed by cattle becomes degraded to grassland pasture, and plant cover is reduced for many years following removal of cattle from an area. Several alien grasses and legumes purposely introduced for cattle forage have become noxious weeds (Tomich 1986; Cuddihy and Stone 1990). *Schiedea salicaria* is currently threatened by direct damage from cattle, such as trampling of plants and seedlings and erosion of substrate (Clarke and Cuddihy 1980; van Riper and van Riper 1982; Scott *et al.* 1986; Culliney 1988). Cattle have been fenced out of one population of this taxon. No other known conservation measures have been taken to date to address this threat.

B. Overutilization for commercial, recreational, scientific, or educational purposes.

None known.

C. Disease or predation.

Cattle may browse directly on the plants (R. Hobdy, pers. comm. 1996). A cattle exclosure fence protects one population of this taxon. No other known conservation measures have been taken to date to address this threat.

D. The inadequacy of existing regulatory mechanisms.

Hunting of feral cattle, the primary threat to this species, is no longer allowed in Hawaii (Hawaii Department of Land and Natural Resources 1985) except under permitted conditions. Cattle have been fenced out of one population of this taxon; however, without continued monitoring and maintenance of those fences, cattle from surrounding pasture areas can easily access fenced areas. No other known conservation measures have been taken to date to address this threat.

E. Other natural or manmade factors affecting its continued existence.

This species is threatened by nonnative plant species, and by fire (R. Hobdy, pers. comm. 1996).

The original native flora of Hawaii consisted of about 1,400 species, nearly 90 percent of which were endemic. Of the total native and naturalized Hawaiian flora of 1,817 taxa, 47 percent were introduced from other parts of the world, and nearly 100 species have become pests (Smith 1985; Wagner *et al.* 1999a). Several studies (Cuddihy and Stone 1990; Wood and Perlman 1997; Robichaux *et al.* 1998) indicate nonnative plant species may outcompete native plants similar to *Schiedea salicaria*. Competition may be for space, light, water or nutrients, or there may be a chemical inhibition of other plants (Smith 1985; Cuddihy and Stone 1990). In addition, nonnative pest plants found in habitat similar to that of this species have been shown to make the habitat less suitable for native species (Smathers and Gardner 1978; Smith 1985; Medeiros *et al.* 1992; Loope and Medeiros 1992; Ellshoff *et al.* 1995; Meyer and Florence 1996; Medeiros *et al.* 1997; Loope *et al.* 2004). In particular, alien pest plant species modify habitat by modifying availability of light, altering soil-water regimes, modifying nutrient cycling, or altering fire characteristics of native plant communities (Smith 1985; Cuddihy and Stone 1990; Vitousek *et al.* 1987). Because of demonstrated habitat modification and resource competition by nonnative plant species in habitat similar to *Schiedea salicaria* the Service believes nonnative plant species are a threat to this species. No known conservation measures have been taken to date to address this threat.

*Schiedea salicaria* is threatened by fire in its dry shrubland habitat (R. Hobdy, pers. comm. 1996). Because Hawaiian plants were subjected to fire during their evolution only in areas of volcanic activity and from occasional lightning strikes, they are not adapted to recurring fire regimes and do not quickly recover following a fire. Alien plants are often better adapted to fire than native plant species, and some fire-adapted grasses have become widespread in Hawaii. Native shrubland and dry forest can thus be converted to land dominated by alien grasses. The presence of such species in Hawaiian ecosystems greatly increases the intensity, extent, and frequency of fire, especially during drier months or drought. Fire-adapted alien plant taxa can reestablish in a burned area, resulting in a reduction in the amount of native vegetation after each fire. Fire can destroy dormant seeds as well as plants, even in steep or inaccessible areas. Fires may result from natural causes, or they may be accidentally or purposely started by humans (Cuddihy and Stone 1990, D'Antonio and Vitousek 1992; Friefelder *et al.* 1998). No known conservation measures have been taken to date to address this threat.

#### CONSERVATION MEASURES PLANNED OR IMPLEMENTED

This species is represented in an *ex situ* collection (Maui Nui Botanical Garden) (U.S. Fish and Wildlife Service Controlled Propagation Database 2005).

#### SUMMARY OF THREATS:

The major threats to this species include cattle that directly prey upon it and degrade and destroy habitat, fire, and nonnative plants that compete for light and nutrients, which are believed to be a major cause of the decline of this species throughout its range. An ungulate exclosure fence protects one population. No other on-the-ground conservation efforts have been initiated.

#### LISTING PRIORITY

THREAT			
Magnitude	Immediacy	Taxonomy	Priority
<b>High</b>	<b>Imminent</b>	Monotypic genus	1
		<b>Species</b>	<b>2*</b>
	Non-imminent	Subspecies/population	3
		Monotypic genus	4
		Species	5
Moderate to Low	Imminent	Subspecies/population	6
		Monotypic genus	7
		Species	8
	Non-imminent	Subspecies/population	9
		Monotypic genus	10
		Species	11
		Subspecies/population	12

#### **Rationale for listing priority number:**

##### *Magnitude:*

This species is highly threatened by cattle that directly prey upon it and degrade and destroy habitat, fire, and nonnative plants that compete for light and nutrients. Threats to the dry shrubland habitat of *Schiedea salicaria* occur throughout its range and are expected to continue or increase without control or eradication. An ungulate exclosure fence protects only one population. No other known conservation measures have been taken to date to address these threats.

##### *Imminence:*

Threats to *Schiedea salicaria* from cattle, fire, and nonnative plants are imminent because they are ongoing.

Yes Have you promptly reviewed all of the information received regarding the species for the purpose of determining whether emergency listing is needed?

Is Emergency Listing Warranted? No. The species does not appear to be appropriate for emergency listing at this time because the immediacy of the threats is not so great as to imperil a significant proportion of the taxon within the time frame of the routine listing process. An ungulate exclosure fence protects only one population. If it becomes apparent that the routine listing process is not sufficient to prevent large losses that may result in this species' extinction, then the emergency rule process for this species will be initiated. We will continue to monitor the status of *Schiedea salicaria* as new information becomes available. This review will determine if a change in status is warranted, including the need to make prompt use of emergency listing procedures.

#### DESCRIPTION OF MONITORING:

Much of the information in this form is based on the results of a meeting of 20 botanical experts held by the Center for Plant Conservation in December of 1995, and was updated by personal communication with Robert Hobdy of the Hawaii Division of Forestry and Wildlife in 1996. We have incorporated additional information on this species from our files and the most recent supplement to the *Manual of the Flowering Plants of Hawaii* (Wagner and Herbst 2003). In 2004, the Pacific Islands office contacted the following species experts: Bob Hobdy, retired from Hawaii Division of Forestry and Wildlife; Joel Lau, Hawaii Natural Heritage Program; Art Medeiros, U.S.G.S. Biological Resources Discipline; Hank Oppenheimer, resource manager for Maui Land and Pineapple Company; and Steve Perlman and Ken Wood, National Tropical Botanical Garden. New information on range and status was provided by Hank Oppenheimer in 2004. In 2005 we contacted the species experts listed below and confirmation of the status of *Schiedea salicaria* was provided by Hank Oppenheimer.

The Hawaii Natural Heritage Program identified this species as critically imperiled (Hawaii Natural Heritage Program Database 2004). Based on the International Union for Conservation of Nature and Natural Resources Red Plant Data Book rarity categories, this species is recognized as Vulnerable (likely to be endangered unless threats to its survival are removed or reduced) by Wagner *et al.* (1999b).

A species expert has provided new information confirming the status of the species this year and the results are included in this assessment.

#### COORDINATION WITH STATES:

In October 2004 we provided the Hawaii Division of Forestry and Wildlife with copies of our most recent candidate assessments for their review and comment. Vickie Caraway, the State botanist, reviewed the information for this species and provided no additional information or corrections (V. Caraway, pers. comm. 2005).

#### LITERATURE CITED

List all experts contacted:

Name	Date	Place of Employment
1. Joel Lau	June 28, 2005	Hawaii Natural Heritage Program
2. Art Medeiros	June 28, 2005	U.S.G.S. Biological Resources Discipline
3. Jim Jacobi	June 28, 2005	U.S.G.S. Biological Resources Discipline
4. Rick Warshauer	June 28, 2005	U.S.G.S. Biological Resources Discipline
5. Hank Oppenheimer*	June 28, 2005	Maui Land and Pineapple Company
6. Kapua Kawelo	June 28, 2005	U.S. Army
7. Dave Lorence	June 28, 2005	National Tropical Botanical Garden
8. Steve Perlman	June 28, 2005	National Tropical Botanical Garden
9. Ken Wood	June 28, 2005	National Tropical Botanical Garden
10. Marie Bruegmann	July 13, 2005	U.S. Fish and Wildlife Service
11. Vickie Caraway	June 14, 2005	Hawaii Division of Forestry and Wildlife

\*Provided new information on this taxon in 2005

List all databases searched:

Name	Date
1. Hawaii Natural Heritage Program	2004
2. U.S. Fish and Wildlife Service Controlled Propagation Database	2005

Other resources utilized:

- Center for Biological Diversity, Dr. Jane Goodall, Dr. E.O. Wilson, Dr. Paul Ehrlich, Dr. John Terborgh, Dr. Niles Eldridge, Dr. Thomas Eisner, Dr. Robert Hass, Barbara Kingsolver, Charles Bowden, Martin Sheen, the Xerces Society, and the Biodiversity Conservation Alliance. 2004. Hawaiian Plants: petitions to list as federally endangered species. May 4, 2004.
- Clarke, G., and L.W. Cuddihy. 1980. A botanical reconnaissance of the Na Pali coast trail: Kee Beach to Kalalau Valley (April 9-11, 1980). Division of Forestry and Wildlife, Department of Land and Natural Resources, Hilo, Hawaii.
- Cuddihy, L.W., and C.P. Stone. 1990. Alteration of native Hawaiian vegetation; effects of humans, their activities and introductions. Coop. Natl. Park Resources Stud. Unit, Hawaii. 138 pp.
- Culliney, J.L. 1988. Islands in a far sea; nature and man in Hawaii. Sierra Club Books, San Francisco. 410 pp.
- D'Antonio, C.M. and P.M. Vitousek. 1992. Biological invasions by exotic grasses, the grass/fire cycle and global change. Annual Review of Ecology and Systematics 23: 63-88.
- Ellshoff, Z.E., D.E. Gardner, C. Wikler, and C.W. Smith. 1995. Annotated bibliography of the genus *Psidium*, with emphasis on *P. cattleianum* (strawberry guava) and *P. guajava* (common guava), forest weeds in Hawai'i. Cooperative National Park Resources Studies Unit, University of Hawaii. Technical Report 95.
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- Hawaii, Department of Land and Natural Resources. 1985. Hunting in Hawaii, Division of Forestry and Wildlife, Honolulu, 3 pp.
- Loope, L.L. and A.C. Medeiros. 1992. A new and invasive grass on Maui. Newsletter of the Hawaiian Botanical Society 31: 7-8.
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- Maui Pineapple Company, Ltd. 1999. Pu'u Kukui Watershed Management Area, Kahalawai, Maui, Hawai'i, Fiscal Year 1999 Progress Report, Biannual Report. Submitted to the State of Hawai'i Department of Land and Natural Resources Natural Area Partnership Program, January, 1999.
- Medeiros, A.C., L.L. Loope, P. Conant and S. McElvaney. 1997. Status, ecology, and management of the invasive plant, *Miconia calvenscens* DC (Melastomataceae) in the Hawaiian Islands. Bishop Mus. Occas. Pap. 48: 23-36.
- Medeiros, A.C., L.L. Loope, T. Flynn, S.J. Anderson, L.W. Cuddihy, and K.A. Wilson. 1992. Notes on the status of an invasive Australian tree fern (*Cyathea cooperi*) in Hawaiian rain

- forests. *American Fern Journal* 82: 27-33.
- Meyer, J.-Y. and J. Florence. 1996. Tahiti's native flora endangered by the invasion of *Miconia calvenscens* D.C. (Melastomataceae). *Journal of Biogeography* 23: 775-781.
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- Scott, J.M., S. Mountainspring, F.L. Ramsey, and C.B. Kepler. 1986. Forest bird communities of the Hawaiian Islands: Their dynamics, ecology, and conservation. *Studies in Avian Biology* 9:1-429. Cooper Ornithological Society, Los Angeles.
- Smathers, G.A. and D.E. Gardner. 1978. Stand analysis of an invading firetree (*Myrica faya* Aiton) population, Hawai'i. *Proceeding of the Second Conference on Natural Science, Hawaii Volcanoes National Park*, pp. 274-288.
- Smith, C.W. 1985. Impact of alien plants on Hawai'i's native biota: *In* Stone, C.P., and J.M. Scott (eds.), *Hawai'i's terrestrial ecosystems: preservation and management*. Coop. Natl. Park Resources Stud. Unit, Univ. Hawaii, Honolulu, pp. 180-250.
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- van Riper, S.G., and C. van Riper III. 1982. *A field guide to the mammals in Hawaii*. The Oriental Publishing Company, Honolulu. 68 pp.
- Vitousek, P.M., C.M. D'Antonio, L.L. Loope, M. Rejnaneck, and R. Westerbrooks. 1997. Introduced species: a significant component of human-caused global change. *New Zealand Journal of Ecology* 21(1): 1-16.
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- Wagner, W.L., D.R. Herbst, and S.H. Sohmer. 1999a. *Manual of the Flowering Plants of Hawai'i*, Bishop Mus. Spec. Publ. 97:1-1918. University of Hawaii Press and Bishop Museum Press, Honolulu.
- Wagner, W.L., M.M. Brueggmann, and J.Q.C. Lau. 1999b. *Hawaiian vascular plants at risk: 1999*. Bishop Mus. Occas. Pap. 60: 1-58.
- Wagner, W.L. and D.R. Herbst. 2003. Electronic supplement to the manual of flowering plants of Hawai'i, version 3.1. December 12, 2003. Available from the Internet. URL: <http://rathbun.si.edu/botany/pacificislandbiodiversity/hawaiianflora/supplement.htm>.
- Wenkam, R. 1969. *Kauai and the park country of Hawaii*. Sierra Club, San Francisco. 160 pp.
- Wood, K.R. and S. Perlman. 1997. *Maui 14 plant survey final report*. Submitted by National Tropical Botanical Garden, October, 1997.

APPROVAL/CONCURRENCE: Lead Regions must obtain written concurrence from all other Regions within the range of the species before recommending changes to the candidate list, including listing priority changes; the Regional Director must approve all such recommendations. The Director must concur on all 12-month petition findings, additions of species to the candidate list, removal of candidate species, and listing priority changes.

Approve: **Acting** David W. Winkler 11/10/05  
Regional Director, Fish and Wildlife Service Date

Marshall P. Jones

Concur: \_\_\_\_\_ August 23, 2006  
Director, Fish and Wildlife Service Date

Do not concur: \_\_\_\_\_  
Director, Fish and Wildlife Service Date

Date of annual review: September 16, 2005  
Conducted by: Marie M. Bruegmann, Pacific Islands FWO  
Plant Recovery Coordinator

Comments:  
PIFWO Review

Reviewed by: Christa Russell Date: September 19, 2005  
Plant Conservation Program Leader

Gina Shultz Date: October 14, 2005  
Assistant Field Supervisor,  
Endangered Species

Patrick Leonard Date: October 14, 2005  
Field Supervisor